SH-IA/IC e TH-IA/IC series

Photocells

Type 2 and Type 4

features

- M18 Models 10 m (axial optic) and 5 m (radial optic) operating distance
- M30 models 60 m operating distance
- EN50100 Category 2 and Category 4 compliant
- LED indicators
- Plastic and Metal Housing
- Inputs and Outputs IEC61131-2 compliant and adaptable with any safety module
- To be used together with a Category 2 or Category 4 safetyu control unit to obtain a safety system EN ISO 13849 compliant



download area

- Application notes
- Photos
- Catalogue / Manuals

code description

SH 2 / E - 0 E IC

series	SH	M18 safety photocell
type	2	Type 2, 123 kHz modulation
	4	Type 4 123 kHz modulation
model	E	Emitter unit
	R	Receiver unit
housing	0	Plastic housing, axial emission
	1	Metal housing, axial emission
	2	Plastic housing, radial emission
	3	Metal housing, radial emisison
connection	E	M12 connector output
	K	M12 radial connector output
logic	IC	Emitter Test Input Logic H = light L = dark, Receiver Output Logic: H = light, L = dark
	IA	Emitter Test Input Logic L = light H = dark, Receiver Output Logic: L = light, H = dark

TH 2 / E - K IC

series	TH	M30 safety photocell
type	2	Type 2, 123 kHz modulation
	6	Type 4, 123 kHz modulation
model	E	Emitter unit
	R	Receiver unit
connection	K	M12 radial connector
logic	IC	Emitter Test Input Logic H = light L = dark, Receiver Output Logic: H = light, L = dark
	IA	Emitter Test Input Logic L = light H = dark, Receiver Output Logic: L = light, H = dark

available models (Type 2)

series	diameter	emission	optic	operating distance	connection	housing	unit	model
SH2	M18	red	type 2 axial	10 m	M12 axial	plastic	emitter	SH2/E-0EIC
			type 2 axial	10 m	M12 axial	plastic	receiver	SH2/R-0EIC
			type 2 radial	5 m	M12 axial	plastic	emitter	SH2/E-2EIC
			type 2 radial	5 m	M12 axial	plastic	receiver	SH2/R-2EIC
			type 2 axial	10 m	M12 axial	metallic	emitter	SH2/E-1EIC
			type 2 axial	10 m	M12 axial	metallic	receiver	SH2/R-1EIC
			type 2 radial	5 m	M12 axial	metallic	emitter	SH2/E-3EIC
			type 2 radial	5 m	M12 axial	metallic	receiver	SH2/R-3EIC
			type 2 axial	10 m	M12 radial	plastic	emitter	SH2/E-0KIC
			type 2 axial	10 m	M12 radial	plastic	receiver	SH2/R-0KIC
			type 2 axial	10 m	M12 radial	metallic	emitter	SH2/E-1KIC
			type 2 axial	10 m	M12 radial	metallic	receiver	SH2/R-1KIC

available models (Type 4)

series	diameter	emission	optic	operating distance	connection	housing	unit	model
SH4	M18	red	type 4 axial	10 m	M12 axial	plastic	emitter	SH4/E-0EIC
			type 4 axial	10 m	M12 axial	plastic	receiver	SH4/R-0EIC
			type 4 axial	10 m	M12 axial	plastic	emitter	SH4/E-0EIA
			type 4 axial	10 m	M12 axial	plastic	receiver	SH4/R-0EIA
			type 4 radial	5 m	M12 axial	plastic	emitter	SH4/E-2EIC
			type 4 radial	5 m	M12 axial	plastic	receiver	SH4/R-2EIC
			type 4 axial	10 m	M12 axial	metallic	emitter	SH4/E-1EIC
			type 4 axial	10 m	M12 axial	metallic	receiver	SH4/R-1EIC
			type 4 axial	10 m	M12 axial	metallic	emitter	SH4/E-1EIA
			type 4 axial	10 m	M12 axial	metallic	receiver	SH4/R-1EIA
			type 4 radial	5 m	M12 axial	metallic	emitter	SH4/E-3EIC
			type 4 radial	5 m	M12 axial	metallic	receiver	SH4/R-3EIC
			type 4 axial	10 m	M12 axial	plastic	emitter	SH4/E-0KIA
			type 4 axial	10 m	M12 radial	plastic	receiver	SH4/R-0KIA
			type 4 axial	10 m	M12 radial	metallic	emitter	SH4/E-1KIA
			type 4 axial	10 m	M12 radial	metallic	receiver	SH4/R-1KIA
TH2	M30		type 4 axial	60 m	M12 radial	metallic	emitter	TH2/E-KIC
			type 4 axial	60 m	M12 radial	metallic	receiver	TH2/R-KIC
TH6			type 4 axial	60 m	M12 radial	metallic	emitter	TH6/E-KIC
			type 4 axial	60 m	M12 radial	metallic	receiver	TH6/R-KIC
			type 4 axial	60 m	M12 radial	metallic	emitter	TH6/E-KIA
			type 4 axial	60 m	M12 radial	metallic	receiver	TH6/R-KIA

technical specifications

type 2 qand type 4 according to EN/IEC 61496-1/2





	SH axial	SH radial	TH
			
nominal operating distance Excess Gain = 2	0...16 m	0...7 m	0...84 m
nominal operating distance Excess Gain = 4	0...11 m	0...5 m	0...60 m
model	M18		M30
spot diameter	12		26
minimum detectable object	ø 15 mm		ø 24 mm
emission	red		
Effective Aperture Angle (EAA)	typical 1,8°; ± 2,5°		
power supply	10...30 Vcc		
current comsumption	≤ 25 mA (emitter); ≤ 25 mA (receiver); 22 mA (typical, light mode)		
output current	50 mA; 70 mA max		
emission wavelength	660 nm		
standard modulation frequency	123 KHz		
supply voltage UB	19,2 V...28 V		
residual ripple	≤ 5 V		
HIGH level output	U_B - 3,2 V ... U_B - 2,5 V (typical)		
LOW level output	5 V		
reaction time receiver output per transaction LIGHT / DARK	200 µs, from front to LOW DARK models for IC , to HIGH for models IA		
reaction time receiver output per transaction DARK /LIGHT	400 µs, from front to LIGHT UP models for IC , LOW models for IA		
response time of safety	it would depend on the security utility		
LOW input Test projector	< 5 V IC output inactive ; model IA active issue		
HIGH input Projector test	vin test >> 15 V IC output active ; model IA issue inactive		
test input LOW level (Emitter)	IC models , LOW = DARK ; HIGH = LIGHT IA models , HIGH = DARK ; LOW = LIGHT		
electrical protection class	III		
mechanical protection	IP67 (EN60529)		
working temperature	-40 °C... + 55 °C (typical + 20 °C)		
storage temperature	-40°C... + 75°C		
humidity (no condensation)	15%...95%		
weight	30 g (plastic); 67 g (metallic)		212 g
shocks	10 g; 16 ms; (IEC60068-2-6)		
vibration	10 Hz ... 55 Hz, 1 oct./min, 0,35 mm (IEC 60068-2-6)		
material	Lens: Glass with PBT ring; Housing: Brass nickel-plated or PBT; M12 plug:PC		Lens: Glass, alumi-nium; Housing: Brass nickel plated; End cap: PC; M12 plug: PBT

The values refer to an ambient temperature of –20°C +55°C, without condensation. For temperature -40°C ... -20°C, ranges are reduced to 70%

no load

external power supply to the devices must include a brief power failure of up to 20 ms In conformity with EN 60204. Suitable power supplies are commonly available on the market . Operation with the network short-circuit proof max. 8 A. The connections used are protected against reverse polarity. The sensors SH and TH, and the test device downstream, are connected to the same municipality and for paving ground.

must not exceed or fall below of UB tolerances

the output of the sensor is normally connected to the test device, isn't an OSSD as for IEC 61496-1

safety specifications (Machinery Directive 2006/42/CE)

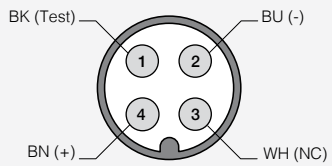
Type 2 M18 and M30 safety photocells	
type	2 (IEC 61496) [1]
safety integrity level	SIL1 (IEC 61508), SIL CL 1 (EN 62061) [1]
category	2 (EN ISO 13849) [1]
self test frequency [2]	100/s (EN ISO 13849)
maximum frequency of request [3]	60/min (EN ISO 13849)
performance level	PL c (EN ISO 13849) [1]
PFH_d [4]	1 x 10^{-6}
TM (life time)	20 years

Type 4 M18 and M30 safety photocells	
type	4 (IEC 61496) [1]
safety integrity level	SIL3 (IEC 61508), SIL CL 3 (EN 62061) [1]
category	4 (EN ISO 13849) [1]
performance level	PL e (EN ISO 13849) [1]
PFH_d [4]	60/min (EN ISO 13849)
performance level	8,1 x 10^{-6}
TM (life time)	20 years

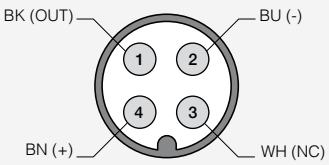
[1] Only in combination with suitable test devic [2] The test rate must not be exceeded
[3] Between two requests for a safety-related reaction from the device, at least 100 internal or external tests must be undertaken [4] Average probability of failure per hour, due to a serious error

electrical connections

M12 emitter

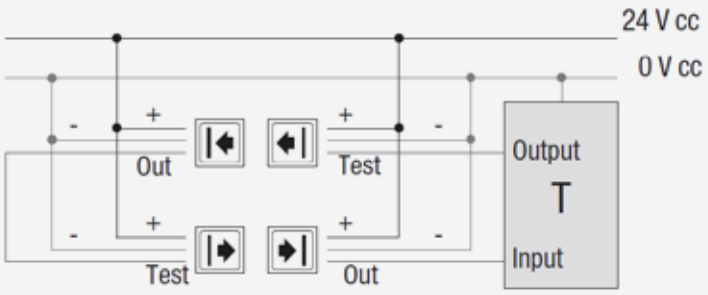


M12 receiver



BN	brown
BU	blue
BK	black
WH	white

2 sensors caascade connection example

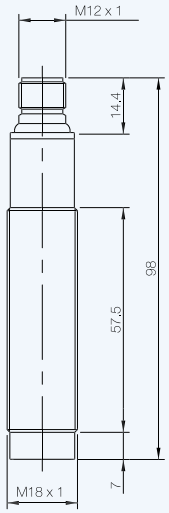


The pairs remote, comprise an emitter and a receiver connected in a chain, that are running the repeater function, must be homogeneous, that is composed of an emitter and a receiver both with the same logic of Test and Exit (both type IC or IA). Couples connected to the test unit must obviously be chosen logically compatible with that unit. It should not exceed a maximum of three pairs of sensors in the chain. If you use more than one pair of monitoring sensors connected in the chain, it must always be strictly observed that the angle of propagation / reception angle of a pair of sensors does not interfere with the other of the same chain. If you use more than one pair of monitoring sensors connected to the same unit and this unit does not use a scanning procedure of the pairs it must be strictly observed that the angle of propagation / reception angle of a pair of sensors does not interfere with the other the same unit. If it takes more units it is possible that pairs of the different units may interfere, in this case the phase of test can fail causing blockages or sporadic system. Only in this case, to avoid interference it is possible to use models with different modulation frequency.

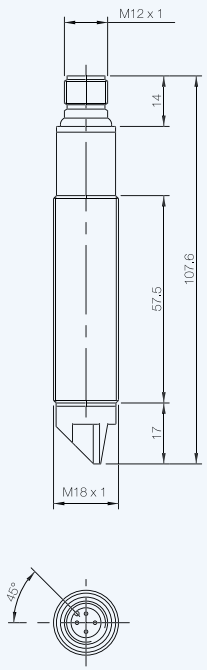
dimensions (mm)

plastic housing

SH2(4)/*-0EIC(IA)



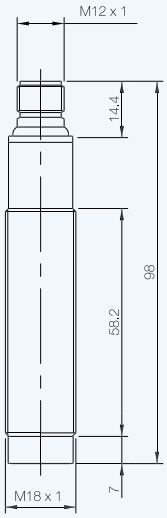
SH2(4)/*-2EIC(IA)



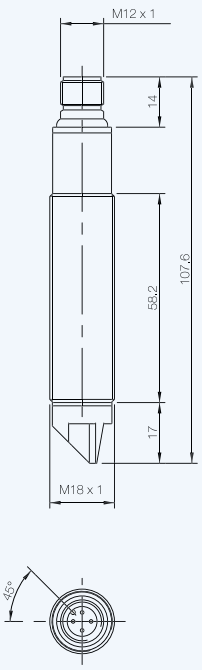
dimensions (mm)

metal housing

SH2(4)/*-1EIC(IA)



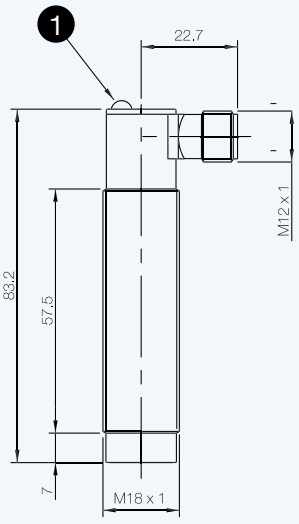
SH2(4)/*-3EIC(IA)



dimensions (mm)

metal housing

SH2(4)/*-*KIC(IA)

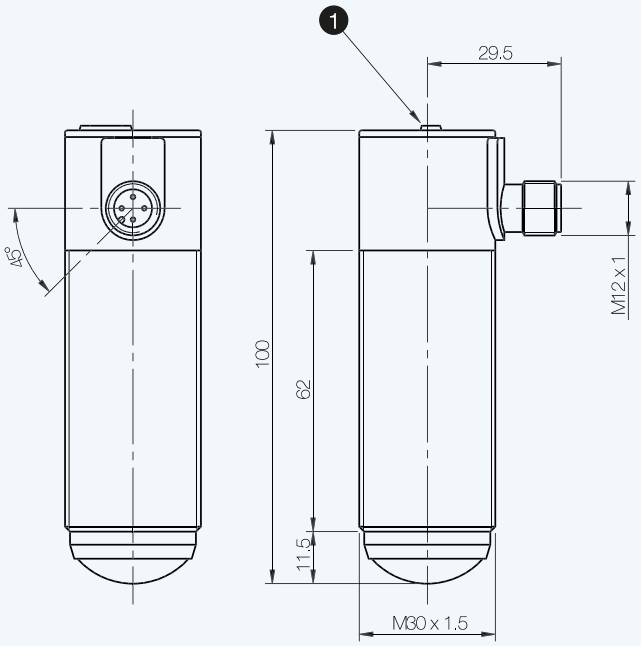


1 LED

dimensions (mm)

metal housing

TH2(6)/*-1KIC (IA)



1 LED